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ABSTRACT

This study examined the effects of training community college students in two reading strategies, self-questioning and summarization, on their comprehension and retention of expository material. Eight developmental reading students from a community college in central New Jersey were taught the strategies of summarization and self-questioning and then were tested on their comprehension and retention of the passages they read. Results indicate that while neither strategy significantly increased students' comprehension, self-questioning while reading may enhance students' retention of textbook material. (Contains 21 references and 3 tables of data.) (Author/RS)

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Comprehending expository text

By:
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Abstract

This study examined the effects of training students in two reading strategies, self-questioning and summarization, on their comprehension and retention of expository material. Eight developmental reading students from a community college in central New Jersey were taught the strategies of summarization and self-questioning and then were tested on their comprehension and retention of the passages they read. Results indicate that while neither strategy significantly increased students' comprehension, self-questioning while reading may enhance students' retention of textbook material.

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Introduction

Researchers question the effectiveness of learning strategies in the improvement of reading comprehension and retention of expository material, and they inquire whether or not these strategies can be taught to the point where students use them instinctively and independently (King, 1992; Deshler, Schumaker, Alley, & Warner, 1984).

Wittrock (1974, 1990) suggests "generative" learning strategies and study strategies, those in which "students interact with text to generate unique learning or study aids," such as summarization and self-questioning, enable students to better comprehend and retain information. King (1992) indicates earlier research in reading comprehension has shown both strategies of self-questioning and summarizing can be practical strategies for encoding and remembering material presented in text format. However, Wong (1985) points out, in order for students to effectively use the self-questioning strategy, they need to receive sufficient training, explicit or direct instruction on generation of questions, and sufficient processing time to allow students to read designated passages and to generate questions. In addition to the effects of self-questioning on comprehension, Wong notes the questions generated by readers when self-questioning appear to offer a way of "tapping into" some of the cognitive processes of the readers,

information that would be extremely helpful to instructors of developmental readers.

Hypothesis

For purposes of this study, both strategies of summarization and self-questioning for main idea were assumed to increase students' comprehension and retention of expository material. It was hypothesized, however, that self-questioning for main idea would yield even more significant gains in comprehension and retention than summarization.

Procedures

A sample of 15 community college students in one developmental reading class participated in the study. Because of absenteeism, the number of participants decreased to eight by the study's end.

Three passages, each 400 words long, representing such content areas as history and psychology, were taken from Spargo's Timed Readings. These were chosen for equality in length and difficulty.

The study took place over six sessions during the class meetings of a developmental reading course, and instruction and testing occurred at the beginning of each class meeting. Students read three passages at various times in class and were given ten comprehension questions following their reading of each passage. One week after each reading, students were

administered the same comprehension questions to test delayed recall of passage material.

In the first session, students were instructed to simply read passage one; they completed a comprehension test following their reading. Students were then given the same test one week later to test their delayed recall of material in session two. After the test, students were taught how to write summaries and practiced this technique during this session. In session three, students were given the second passage to read and were instructed to summarize the material after reading. Again, they completed a comprehension test following their reading and were then tested one week later on delayed recall in session four. In this session, students were taught to self-question for main idea as they read, using RAP, a mnemonic that helps students to remember to form questions as they read to find the main idea in each paragraph. Students followed these procedures: 1. **R**ead the paragraph, 2. **A**sk a main idea question, and 3. **P**ut the answer into your own words. They were told to also add the question, "Is there anything I do not understand in this paragraph?" to add a metacognitive element to the strategy. Students practiced this strategy in class. In the following session, students were given the third and final passage to read, were directed to self-question as they read, and were given a comprehension test

after reading. The final test on delayed recall was given in session six.

Results

As can be seen in Table I, there was an eight-point difference between the means of the pretest with no activity and the pretest with summarization, and this difference was not significant ($t = -1.05$). There was a difference of 11 points between the means of the pretest with self-questioning and the pretest with no activity; this difference was not significant either ($t = -1.66$).

Table I - Means, Standard Deviations, and t of the Samples' pretest scores

Sample	M	SD	t
Pretest with no activity	63.75	16.85	-1.05
Pretest with summarization	71.25	11.26	
Pretest with no activity	63.75	16.85	-1.66
Pretest with self-questioning	75.00	9.26	

In Table II the results of the posttest with no activity and the posttest with summarization illustrate there was a mean difference of 12.5 points, and this difference was not significant ($t = -1.42$). However, between the means of the posttest with no activity and the posttest with self-questioning there was an 18.5 point difference, and this was significant below the .05 level ($t = -2.33$).

Table II - Means, Standard Deviations, and t of the Samples' posttest scores

Sample	M	SD	t
Posttest with no activity	52.50	21.21	-1.42
Posttest with summarization	65.00	13.09	
Posttest with no activity	52.50	21.21	-2.33
Posttest with self-questioning	71.25	8.35	

Discussion

This study was designed to determine an efficient and effective study method to increase comprehension and retention of textbook material for college students in a remedial reading course. In this study, findings indicate summarization after reading has somewhat better effects on comprehension than no activity, but this was not supported statistically. In addition, there was a trend favoring self-questioning as a method to increase comprehension, but these effects were not substantiated statistically, either. Posttest results, on the other hand, support the notion that training students to generate main-idea questions while reading may enhance their retention of textbook material. These findings support Flavell's and Wellman's (1977) contention that metacognitive processes during reading are effective in transferring information into long-term recall (cited in Brozo, Stahl, & Gordon, 1985).

Conclusion

On the college level, students are required to read and study textbook material on their own. Therefore, it is essential that these students, particularly those who have difficulty with reading, know of and are able to put to use strategies that are effective in increasing both their comprehension and retention of textbook material. Findings in this study suggest that self-questioning for main idea during reading is more effective than the use of no activity while reading and summarization in helping students remember textbook material. However, while self-questioning and summarization both yielded higher comprehension scores than no activity, this difference was not significant.

These results are based on the performance of eight students, so before statements about the generality of the results can be made, this study should be replicated with more students.

Comprehending expository text: Related literature

Students most often pursue a college degree to gain the background knowledge needed to obtain a job in some field or advance in a career. The material they learn in their courses broadens their knowledge bases, and they bring this knowledge with them to the workforce. Therefore, it is essential content area material is comprehended and retained, not only for passing tests but also for putting to use in future careers. In typical college courses, knowledge is gleaned from listening to lectures and reading textbook material. For the average, prepared college student, this reading and comprehending complex expository material can be difficult, yet it is possible. However, for the developmental college reader who generally reads between the fifth- and seventh-grade levels, reading this complex material is almost impossible, and the difficulty stems from these students' reading passively and not implementing reading strategies. Researchers (DiVesta, Hayward, & Orlando, 1979; Garner & Reis, 1981; Fos & Filip, 1984; Smith & Friend, 1986) cited poor readers display less efficient text-scanning strategies and comprehension-monitoring strategies, and less sensitivity to text structure. I find this to be true with most of my developmental reading students. On the first or second class meeting, I have my students read a short passage and I observe their behaviors. Most of them do not underline or annotate text while reading; they seem to just simply scan the

page with their eyes. Andre and Anderson (1978) said students need to be active in the reading process to facilitate learning from text. Gajria and Salvia (1992) suggested systematic instruction in learning strategies strengthens weak reading comprehension while Burdick and Denner (1991) believed teaching students to use comprehension strategies will "lead to more effective comprehension and, in turn, facilitate the acquisition of content knowledge." Haller, Child, and Walberg (1988) reiterated this assumption. "Compensatory strategies, such as self-questioning, rereading, and comparing main ideas with each other may bolster and restore faltering comprehension (p. 6). Burdick and Denner (1991) pointed out that since content area teachers can train students to use only one strategy at a time, it is necessary to determine which strategies are most useful for increasing content knowledge and worth the effort. Researchers have sought to determine which strategies best increase students' comprehension and retention of textbook material. And many of these researchers (Wong, 1985; Davey & McBride, 1986; Haller, Child & Walberg, 1988) have found it is those strategies that provide a metacognitive as well as cognitive element that are efficacious in increasing comprehension and retention of textbook material. The strategies of summarization and self-questioning provide both of these elements, but of these two, which is more valuable?

Selinger, Hutson, and Fortune (1993) cited the importance of summary writing as a skill to increase comprehension and retention of written material, especially in college reading where text material is complex. They assigned 58 college developmental reading students to either a summarization training or active reading strategies (e.g., vocabulary) control group. Students were trained for one and one quarter hours a week for five weeks in their respective strategies. After training, both groups were tested on summarization and reading, and one week later, on delayed recall of the last passage summarized. Results show the summarization training group performed substantially better than the control group on the summarization posttest. Seventy-three percent of the experimental group included 70% or more of the information deemed necessary for summary inclusion while only 14% of the active reading strategies control group did this. And for delayed recall of material, there was a trend favoring those who were trained in summary writing. This supports Brozo and Stahl's (1985) belief that if students "encode information in an optimal form to meet criterion task requirements, they will perform better than their counterparts."

In their study of 70 sixth-grade students, Rinehart, Stahl and Erickson (1986) also found summarization improved recall of written material. Students were required to read a passage from

a social studies chapter and answer questions teachers considered important for them to answer. The researchers found summarization training significantly improved recall of major information, but not minor. They also found summarization training may train students to be more attentive when they read and this greater attention may lead to improved reading.

Wong (1985) reviewed the results of 27 studies that were created to increase students' comprehension of prose through self-questioning instruction, and she examined them through three theoretical perspectives: active processing, metacognitive theory, and schema theory. She found an overwhelming majority of these studies, 22, seemed to stem from the active processing theory which is in order for students to be active comprehenders and independent thinkers, "they must generate questions that shape, focus, and guide their thinking in their reading" (p. 228). Experimenters compared the effectiveness of student-generated versus teacher-generated questions. Their assumptions were: 1. student-generated questions should induce prose processing superior to experimenter- or teacher-generated questions; 2. generation of higher order questions would produce better comprehension because Rickards & DiVesta (1974) presume these would induce more thorough processing of given materials; and 3. generating more questions could induce more processing of prose in students, which in turn would result in better

comprehension and retention (Wong, 1985). Four of the studies were developed out of the metacognitive theory, stemming from Brown's (1980) definition of good readers, which is good readers are those who predict, check, monitor, and have control of their deliberate attempts to study, learn, or solve problems (p. 454). Theoretically, experimenters from the metacognitive theory believed teaching students to ask such questions as, What is the main idea in this paragraph?, and Can I summarize the main points in this paragraph?, as well as, Is there anything I don't understand in this paragraph?, will increase students' awareness when they encounter a reading comprehension difficulty (Wong, 1985). Finally, experimenters using the schema theory framework focused on how readers' prior knowledge influenced their understanding of text. They assumed teaching students to activate relevant prior knowledge through appropriate self-questions is as essential to the reading process as having the appropriate prior knowledge, for Bransford and others (1982) found "…one's reading comprehension may suffer not from lack of prior knowledge but lack of activating it" (Wong, 1985).

Of these 27 studies, Wong found fourteen of them (52%) succeeded in increasing students' prose processing through self-questioning instruction, nine studies failed (33%), and the remainder (19%) had mixed results. Despite the theoretical differences among the studies, Wong construed self-questioning

instruction has been effective in improving students' comprehension of prose. She conjectured those studies that failed to achieve desirable effects consistently showed one or more problems, such as insufficient training of subjects before administering posttests, lack of explicitness in or direct instruction on generation of questions, and insufficient processing time allowed students to read passages and generate questions.

Frase and Schwartz (1975), under the active processing theory, also examined the efficacy of student-generated questions on prose recall. They pointed out that our aim as instructors is to encourage independence in learners to make them capable of controlling their own learning; however, instructor-generated questions "control the cognitive operations that the student performs on the reading content" (p. 628). Frase and Schwartz assumed learner-produced questions would result in higher recall than simply studying text and that subjects would learn more from producing questions than answering someone else's (p. 629). To test their hypotheses, the experimenters enlisted 48 high school students and assigned them to pairs in which they took turns in asking each other questions relating to sections of a passage and then studied one section on their own. They were given instructions to ask each other questions that would help on a posttest but were not told

how many questions to ask. Experimenters tape-recorded everything. After the experiment, subjects had to answer 90 posttest questions and write answers on an answer sheet.

Frase and Schwartz (1975) then conducted a second study, similar to the first, in which they investigated the quantitative and qualitative aspects of student-generated questions. They believed the number of questions asked would affect prose recall. In this study, the same number of subjects worked individually instead of in pairs. They were told to learn the passage for a posttest and were given directions to construct either five or ten questions, depending on their condition. They also were given either no directions on question construction or directions to write questions about "hard to remember facts and things that you wouldn't normally expect to be tested on" (p. 632). After the experiment, subjects answered a 60-item posttest.

Frase and Schwartz found engaging in question production, either individually or in a tutorial situation, augmented recall over just studying. However, these effects were confined to information relating to subjects' questions. They found subjects recalled information for which they had not constructed questions with the same accuracy as information they simply studied. So while student-questioning activities result in improved recall for information that is directly related to

those questions, this information may make up only a small portion of text. They also found the number of questions affects recall slightly but not significantly.

Clark, Deshler, Schumaker, Alley and Warner (1984) echoed Frase and Schwartz's belief that it's essential to teach students, especially disabled or poor readers, how to learn independently. They compared the efficiency of the strategies of visual imagery and self-questions in improving comprehension of written material in LD students. Using the steps for teaching strategies espoused by Deshler, Alley, Warner, and Schumaker (1982), experimenters taught students both strategies and then had students apply them to passages on both their ability and grade levels. Students then took comprehension tests following passages, four measuring students' skills related to visual imagery and three assessing students' self-questioning skills. While both strategies increased students' comprehension (visual imagery: 81.7%; self-questioning: 89.8%), self-questioning did so substantially more.

Proceeding from the metacognitive theory, Andre and Anderson (1978-79) investigated whether or not students could be trained to generate questions based on main points in a text, whether or not this facilitated learning, and whether or not it was important to train them to do so or let them come up with questions on their own. In their first experiment, twenty-nine

high school students participated. The trained group received instruction in self-questioning construction and was told to apply this strategy while reading two 450-word passages. The control group was told to simply read and reread passages. Subjects then took a 20-question comprehension test. They found students with low verbal ability profited more from the self-questioning training than students with high verbal ability.

In a second study, Andre and Anderson (1978-79) divided 81 high school students into three experimental groups: self-questioning with training, self-questioning without training, and rereading. The experiment was conducted the same as the first, and the questioning without training group was told to create four questions for each passage. Results indicate while the two questioning groups did not differ significantly on the posttest, the trained questioning group scored significantly higher than the read-reread group. Anderson (1979) conjectured self-generation of questions may be an effective reading strategy because the student is "forced to pause frequently, deal with an 'understanding question,' determine whether or not comprehension has occurred, and decide what strategic action to take next. It is effective because it combines both metacognitive and cognitive characteristics (p. 621).

While Andre and Anderson (1975) did not find a significant difference between questioning groups, Davey and McBride (1986)

discovered just the opposite. In comparing the posttest results of their three experimental groups– self-questioning training, no-question control, and self-questioning practice with no training–they found the group that practiced generating questions without training performed significantly worse then the trained group on all measures except literal level questions. They surmised these no-training students questioned themselves only on literal information and deduced this points to a need for a training component in self-questioning; directed practice is not sufficient.

King (1989, 1992) included a training component in her studies in which she combined self-questioning training with a somewhat teacher-generated question approach. In these studies where she sought to determine the effects of comprehension strategies on lecture material, King provided students with question stems to guide them in asking higher-order comprehension questions. King (1989) pointed out these "question starters" are necessary because, if a strategy is to be incorporated and used effectively, it needs to be uncomplicated and easy to internalize. This technique allows students to create questions to fill in their own gaps in knowledge and make material more meaningful (Ross & Killey, 1977) while giving instructors some control over students' cognitive operations (Frase & Schwartz, 1975) and reach a

desired goal–to create higher order questions. In the first study, King assigned 32 college students to four treatment groups: cooperative self-questioning, independent self-questioning, cooperative review, and independent review. A pretest was given after the first experimental lecture to measure students' ability to comprehend and remember lecture material. Then, students in both self-questioning groups were trained to create questions using the question stems and metacognitive questions while those in the review groups were told to simply study their lecture notes. Following each of four lectures, students engaged in study sessions in which they reviewed material presented, using their respective strategies as practice. Then following the final lecture, students studied lecture material and then were administered a posttest. Results indicate learners can benefit from using a self-questioning strategy to improve their comprehension of lectures since participants in the self-questioning groups comprehended lecture material significantly better than those students in the review groups: cooperative self-questioning, M=81; individual self-questioning, M=77.1; cooperative review, M=58.2, and independent review, M=64.0.

In a subsequent study conducted by King (1992), 56 college developmental reading students were assigned to one of three experimental conditions: self-questioning, summarizing, and

note-taking review. Students were trained in their respective strategies and then listened to lectures and studied material using their assigned strategies. Those in the self-questioning condition were trained to use question stems while those in the summarizing condition were instructed to write generative summaries, defined by King (1992) as those in which learners use their own words and experiences to construct sentences that do not appear in presented material. Posttest results illustrate summarization and self-questioning increase comprehension better than note-taking review (summarization, M=74.68; self-questioning, M=67.74, and note-taking review, M=59.90). In addition, on a retention test given one week later, self-questioners outperformed both summarization and note-taking review conditions (self-questioning, M=51.05; summarization, M=44.74, and note-taking review, M=33.70). This signifies when material needs to be retained for some length of time, self-questioning is an effective strategy.

King (1992) attributed the success of the self-questioning procedure to its metacognitive component, in that it helps students check how well they are comprehending what they are studying. Davey and McBride (1986) believed this as well: "Students trained in effective self-questioning may have a heightened awareness of their own comprehension," and, "By generating and answering self-questions concerning key points of

a selection, inadequate or incomplete comprehension can be identified and resolved by the reader" (p. 256). Finally, in their investigation of 20 studies dealing with the effects of metacognitive instruction on reading comprehension, Haller, Child, and Walbert (1988) found the "… average effect of metacognitive instruction on reading comprehension is substantial" (p. 8). Research seems to indicate self-questioning that includes a metacognitive component appears to be the most beneficial strategy for increasing reading comprehension and retention of material. Students need not only to be instructed in how to ask questions dealing with text material but also to ask questions such as those suggested in Wong's review (1985) to monitor their understanding of material. Developmental students who lack the awareness of their weak comprehension benefit from the explicitness of self-questioning and metacognitive training. The combination of these two types of training seems to strengthen students' comprehension and retention more than other strategies reviewed.

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Appendix

Table III - Students' Raw Scores

Student #	Test 1	Test 1 re-test	Test 2	Test 2 re-test	Test 3	Test 3 re-test
1	80	70	50	40	80	80
2	60	50	70	60	80	70
3	40	30	70	60	90	80
4	60	60	70	70	60	60
5	80	20	70	70	80	80
6	40	40	70	80	70	70
7	70	80	80	80	70	60
8	80	70	90	60	70	70
Total:	510	420	570	520	600	570
Average:	63.75	52.50	71.25	65	75	71.25